

Remarks/Arguments:

Claims 1-5 22, 23, 29, and 32 remain in the application. New Claim 40 is added, replacing Claim 33. Claims 6-21, 24-28, 30, 31, and 33-39 are canceled. Claims 1, 5, 22, 23, 29, and 32 are amended.

The Office Action states that claims 36 and 39 are so similar that double patenting would result from allowance of both. Claims 33 and 39 are canceled to resolve the issue.

The Office Action rejects the independent claims 1, 22, 23, 32, and 33 as obvious over Cooke, which discloses a system for managing medical images. Cooke discloses an archive for storing images and a database server for storing various other information, which might include annotations, edits, and comments.

Initially, applicant has amended numerous claims to improve clarity and accuracy in the claims. To improve clarity, the identification of the formerly named “file server” and “database server” is changed. These components have been renamed by more appropriate terms, respectively “image host” and “catalog service.” These new terms are intended to prevent the implication of requiring several distinct hardware computers such as might be misunderstood from the former two “server” references. Support is found in the specification at paragraph [0044], which discloses that the file server is made up of host service and the database server is made up of a catalog service.

Further, the claims now refer to management of dental images in order to more accurately identify the area where this management system has best application and resolves long standing problems. As disclosed in applicant’s specification at paragraph [0005], dental offices tend to be quite different from hospitals in that the practices often are small and no computer department is present. It is necessary that the image management system anticipate and meet the dentist’s needs with essentially no professional computer support staff and with minimal physical plant to support and house hardware.

Additional amendments make clear the patentability of the claims and also distinguish from the Cooke patent and from other cited references. Applicant’s image management system is distinguished from Cooke by software architecture and resulting functions that implement performance uniquely beneficial to dental offices. The claims are amended in several respects to better identify the improved architecture and functions. This architecture and its advantages follow primarily from the disclosures of Figs. 1-3 and specification paragraphs [0042] through [0046].

A first basis for patentability of applicant's claims over the Cooke reference is in the independent structure of applicant's catalog service and image host, which have independent, tiered structure. In contrast, Cooke commingles images and metadata. Although Cooke may maintain both an archive station and a database server, the two stations or servers lack the independent structure called for in applicant's amended claims. This distinguishable limitation of Cooke is disclosed at Cooke specification Col 8, lines 64-66: "Instead, edited images and the like are stored to database files on the archive station." Cooke's archive station stores the original medical images, and the quoted disclosure indicates that Cooke's archive station also stores additional image files showing edits. For Cooke to view an edited file, it appears Cooke must transfer a stored file of an edited image from the archive station. These stored, edited files evidently consist of commingled images and metadata. Because they include images, they are large files and require considerable bandwidth, creating a problem of slow transfer. Avoiding this problem is one feature and problem solution of applicant's invention. Applicant's separate catalog service and image host, in independent tiered structure, produce a significant improvement over Cooke.

The independent tier structure of applicant's multi-tiered architecture and the two types of independent bandwidth communications establish a rapid and efficient storage and communication of images. Applicant's multi-tiered architecture is disclosed at Fig. 2 and at paragraph [0006]. The multi-tiered structure enables image data and metadata to be sent with separate bandwidths to the user workstations (23), thereby avoiding delays often associated with transmitting characteristically large files that contain graphic images. As disclosed at paragraphs [0044] through [0046] and Figs 1 and 2, the workstations (23) contain the image spooler (33) and backup spooler (34). Image data is sent over switched connection (39) to and from the image host (30). Communication of metadata between the workstations (23) and catalog service (29) is over a session connection (40), which is represented in the drawings as a double ended arrow due to the continued, bidirectional nature of a session connection.

Applicant reads the image file only as needed from the image host, which typically will be only once per day or once per session. A new connection (39) can be opened each time an image is accessed, since images are transmitted so rarely. Applicant stores the manipulations in the separate catalog service, which is initially read once per session to each workstation (23). Subsequent edits or manipulations made thereafter at any workstation (23) will tend to be relatively small files that are quickly transferred. Notice of such manipulations can be sent individually to the catalog service (29) and back to all workstations (23) over session connection (40) as an ongoing or real time process signified by the double ended arrows representing the session connection (40) in Figs. 2 and 3. By definition, the session connection (40) remains active for the duration of a session, transmitting notice of edits from any workstation (23) to the catalog service and then back to all workstations for local storage, with the result that each workstation will show the image with the most current edits by applying the most current manipulations from the locally stored metadata.

As a second basis for patentability, in addition to rapid performance and efficient storage, applicant's software enables improved sharing of edited images for synchronization of the image at all workstations. The software architecture has the ability to synchronize the currently edited images among plural workstations. The prior paragraph describes this ability. Figs. 2 and 3 best show the architecture, where the session connection (40) operates between catalog service (29) and the several workstations (23), communicating and exchanging notice of current metadata. This architecture synchronizes the most current displayed image on all workstations as a result of communication over the double ended arrows (40). The session connection (40) provides notice of metadata throughout a session to all workstations (23), which results in all workstations having available not only a selected image from the image host but also the selected image in accordance with the most current metadata from the catalog service.

This benefit is largely directed to dental offices, where dentists and their associates, assistants, or consultants may confer in real time while the dentist is performing dental surgery on the patient. Such real time consultation during active treatment is believed to be more common in dental practice than in medical practice. Dental patients are generally treated immediately for dental problems, while in medical practice a complex procedure is likely be planned well in advance and scheduled for a future time after consultations are completed. Thus for a dentist, the ability to automatically synchronize edited images on plural workstations is a unique and beneficial function. Also, small dental offices may have a configuration that utilizes only a single workstation. Cooke has no facility to coordinate and synchronize edits among plural workstations in real time. Also, noting that Cooke requires several workstations including an archive workstation, a database workstation, and reviewing workstations, it is evident that Cooke lacks facility to utilize only a single workstation. While all of these differences reflect upon applicant's advance in the art of image management, the inherent ability of applicant's software architecture to share a most current edited image between different workstations in real time stands out as a most prominent improvement and basis for patentability.

A third basis for patentability over Cooke is found, for example, at Claim 1, line 15, where it is disclosed that the image management system automatically adds generated image manipulations to the image record for the selected digital image. The "automatic" function is represented by session connection (40) shown as double ended arrow (40) in Fig. 3. This automatic functioning represents an important distinction from Cooke, because the automatic operation of the session connection enables the constant update of the image file to all workstations. With this feature present, users at different workstations are able to consult with one another in real time. Cook does not provide automatic exchange of manipulation data and therefore lacks this real time ability.

Page 4, center paragraph of the Office Action acknowledges that Cooke lacks teaching that images are automatically added as manipulations. The Office Action then

cryptically states, “Cooke . . . does disclose (sic) distinguishing that the edits has (sic) been made in reference to the original image” (Citing the Cooke admission of commingled data and image files, that “edited images and the like are stored to database files on the archive station.”) The Office Action then cites In re Venner and In re Rundell for the proposition that substituting an automated process for a manual process is obvious. Applicant believes the proposition of Venner and Rundell is not appropriately applied to the present invention. Applicant’s system offers improvement in addition to automation. As described above, applicant has enabled the synchronization of edited images among plural workstations and created a software architecture that supports rapid and efficient storage, retrieval, and sharing of edited images.

The two citations of case law are answered in part by pointing out that the full meaning from In re Venner: It is not invention to provide a mechanical or automatic means to replace a manual activity *which accomplished the same result* (emphasis added). The emphasized portion adds considerable meaning of the cited cases and show the non-applicability of Venner and Rundell, in light of the remarks in the preceding paragraphs. Further, the courts have diligently endorsed the factual inquiries of Graham v. John Deere, 383 U.S. 1, 148 USPQ 159 (1966) as the standard for determining obviousness. Matters such a scope and contents of the prior art, differences between the prior art and the claims, ordinary level of skill in the art, and evidence of secondary considerations remain of prime importance. The John Deere factual inquiries, like the full statement of the Venner case, acknowledge that the importance of improvement and solution of problems in determining patentability.

Applicant’s contribution to the art stands up to the John Deere factual inquiries. Applicant’s software architecture stores image data and retrieves image data independently of catalog data, minimizing contention. The resulting management system allows rapid file movement and has improved utility that allows real time synchronization among plural workstations. The net result is an improved ability for dentists to consult while performing treatment.

The Office Action rejects claim 5 as obvious over Cooke in view of Howell. The latter is cited as teaching a zoom tool that is used in video conferencing. Howell’s zoom tool is center-and-drag, meaning that the user places his finger on the touch screen at the center of his intended zoom area and then drags his finger to define a zoom box. While such a zoom tool is operable, it can have practical disadvantages. One is that a uniform zoom box is difficult to achieve from one use to another. Each use involves the dragging of a box to achieve an arbitrary box size. For video conferencing, the irregularity between box sizes may be acceptable, but in a dental practice, it would be unacceptable as explained, below. Another disadvantage is that a finger can bounce on a touch screen, ending the drag operation prematurely and thus ending with an accidentally sized zoom box. This result would be unacceptable in a dental setting.

Applicant's Claim 5 is directed to a novel zoom tool fully described at specification paragraph [0063]. Applicant's zoom tool differs from Howell's zoom tool by its adaptation to the needs of a dental office. Applicant's tool first offers size selection by click or tap to pick from several preselected size choices. The size choices provide ease and reliability to a dentist, who repeatedly deals with dental images of a standard size. The dentist wants to see an area of familiar proportions and uniformity to help him gauge the size or depth of a tooth feature that needs repair. The dentist will quickly become familiar with the offered zoom box sizes, such that he will know from experience how the box sizes will convert to real-life sizes. Then he touches the image at the intended point of interest, producing the zoomed image of the chosen box size at the touched point. This zoom tool is adapted to a dentist's needs as he repeatedly deals with the uniformly sized images that are characteristic of dental images. This zoom tool offers an improvement in handling dental images and is both novel and nonobvious in its operation.

Claim 1 is amended to identify the independent multi-tiered structure of the image host and catalog service, to identify the independent connection to the image host and the independent session connection with the catalog service, and to specify that the updating function of the session connection so that a workstation will display a selected image updated for manipulations.

Claim 22 is amended to identify the independent tiered structure of the image host and catalog service, to identify a plurality of workstations served by the image host via independent connection and by the catalog service via session connection, to specify that each of those workstations functions to display a selected image with updated manipulations supplied over the session connection.

Claim 23 is amended to identify the independent multi-tiered structure of the image host and catalog service, to identify a plurality of graphical user interfaces, and to specify that each of those interfaces functions to display an updated image via the exchange of manipulation data with the relevant image record.

Claim 32 is amended to identify the method of image management using an independent tiered structure of the image host and catalog service with a plurality of workstations, and to specify the method by which each of those workstations functions to display a selected image with manipulations.

Claim 40 is a restatement of canceled claim 33 and relates to a set of software instructions stored on a computer. The claim elements identify a software structure serving a plurality of display devices in which an image is acquired and stored, selected for display on a plurality of display devices, and manipulated. The software instructions automatically update the displayed image on each display device based on manipulations made on any of the other display devices.

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Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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